New doubts on the importance of the logographic stage

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NEW DOUBTS ON THE IMPORTANCE OF THE LOGOGRAPHIC STAGE: A LONGITUDINAL STUDY OF FRENCH CHILDREN

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Running Head: doubts on the importance of logographic stage

Abstract

The objective of this longitudinal study was to evaluate reading strategies used by French children. A group of prereaders (N=37) was followed from the beginning of kindergarten to the end of the first grade. In kindergarten, they were non-readers. They were presented with a series of word to picture matching tasks twice in kindergarten and twice in first grade. The aim of the observation was to evaluate the utilization of logographic strategies which are characterized by a large reliance on the global form of the word (its length, see study 1), by the non-sequentiality of processing (study 2) and by the use of salient visual -- and not phonological -- cues (study 3). In these three studies we took into account correct responses and justifications. Relations between metaphonological abilities, letter knowledge and prereading strategies were also assessed (studies 4 and 5). Our data showed that first graders did not use logographic strategies; their results were characterized by a great amount of correct responses with pertinent justifications, by the use of sequential processing and by sensitivity to phonic characteristics of items. For kindergarteners, we could not actually observe trace of logographic strategies besides the fact that they 'read' rather the environment (the picture) than the word itself as indicated by the importance of semantic justifications (for example, acceptation of 'bicyclette' justified by 'it is written vélo'). Moreover, their performance did not improve between the two kindergarten sessions. Nevertheless, there was a change between these sessions in the use of letter justification. But these justifications were already prevalent as of the first session and were only produced by some children, those having better letter knowledge and better metaphonological levels. Results indicated that those children used prereading strategies that relied on partial alphabetic cues. Yet it seems difficult to assert that the other children would only relied on visual strategies since their performance was sensitive to the phonological properties of items. These results lead us to question the generality of some aspects of reading developmental models resulting from research bearing only on English-speaking subjects.

The aim of this study was to evaluate the nature of processes involved in prereaders and beginners in reading. According to predictions from developmental models, prereaders use logographic strategies (Frith 1985, 1986; Morton 1989; Harris & Coltheart 1986; Seymour 1986; Marsh, Friedman, Welsch & Desberg, 1981). These strategies can be characterized, on the one hand by the use of non-linguistic contextual cues. According to Augst (1986), Christopher recognizes 'Esso' only when it is surrounded by an oval. On the other hand, logographic strategies are characterized by the fact that visual cues related to the whole shape of the word or to particularly salient configurations are used. For example, Thomas, aged 4, reads 'pull' instead of 'yellow', perhaps because of the two 'll's (Morton 1989). The use of salient visual cues, corresponding to what Marsh et al. (1981) and Harris & Coltheart (1986) called the discrimination-net phase, leads children to choose the more plausible response -- the best candidate -- within the set of written words they know. Finally, another important characteristic of the logographic stage, is that they take no account of the order of letters, that is to say the sequentiality of writing. Thus, Thomas recognizes 'yellow' in 'yollwo' or 'milk' in 'mlik' (Morton, 1989). Frith (1985, 1986) notes equally that there may be, at this stage, instant recognition of some familiar words 'known by heart' (see also on that point Marsh et al. 1981).

These different types of information processing might allow for the constitution of a sight vocabulary, words being processed, like pictures, by a pictorial semantic system but not by a verbal semantic system (Morton 1989). According to Seymour & Elder (1986), a hundred word vocabulary can be discriminated, children being able to rely on three types of length (short, medium, long), three places (left, centre, right), and a dozen salient shapes. Moreover, for Frith (1985, 1986) and Morton (1989), there is a strict successiveness between these first types of information processing and alphabetic procedures used later; these two types of processing cannot manifest at the same time.

Besides examples cited in developmental models, experiments conducted to elicit the existence and nature of logographic procedures are rather few (Mason 1980; Masonheimer, Drum & Ehri 1984; Ehri & Wilce 1985; 1987; Seymour & Elder 1986; Stuart & Coltheart 1988; Stuart 1990; Wimmer & Hummer 1990; Gough & Juel 1991; Wimmer, & Hummer 1990; Wimmer, Landerl, Linortner & Hummer 1991; Byrne 1991; Seymour, Bunce & Evans 1992; Rieben 1993).

As to the role of the graphic environment in prereading, there is an experiment by Masonheimer, Drum & Ehri (1984). These authors found about a hundred children, aged from 3 to 5, who were experts in 'environmental reading'. These subjects could perfectly read words when shown in context, for instance, 'coca-cola' as a logo. But they were unable to read the same words out of context. Similar results were found by Gough & Juel (1991) in an experiment involving 32 children aged from 4 to 5. In this experiment, children had to learn four words shown on four cards. One of these cards was different from the others, by the presence of a thumbprint. Results showed that children learnt more rapidly the word on the thumbprint card, yet were unable to recognize this word when presented on a normal card. On the contrary, they could 'read' the word on the thumbprint card even when there was nothing written on it. As Mason (1980) remarked, in these two cases, children seem to 'read' environment rather than alphabetic signs.

Moreover, Byrne's (1991) studies have shown that prereaders might understand entire words as symbols without being able to treat non-lexical units. Thus, in a learning transference task between word pairs like 'bat' and 'fat' versus 'bun' and 'fun', children aged 4:5 failed, the same task being managed by children of the same age when units were words, for example 'little boy' and 'big boy' versus 'little fish' and 'big fish'.

Finally, a study by Seymour & Elder (1986) reveals that, at the logographic stage, children, on the one hand, could read only words they knew, on the other hand made above all visual-type errors and, lastly, did not use sequential processing -- letter to letter -- of the words. These results were derived from observation, over a year, of about twenty children who were learning to read using a strictly global method. These subjects were aged from 4:6 to 5:6, at the beginning of the study. They couldn't read and did not know letter-sound correspondence. They were asked, several times during year, to read aloud words of which one of two belonged to vocabulary learnt in the classroom. Results showed that correct responses -- very few -- involved specially familiar words. Erroneous responses were essentially of two types. Children produced, instead of an unfamiliar written word, a word they knew or a word having a visual proximity with the target item: either the same length, or common letters. Moreover, Seymour & Elder observed that time taken to answer did not depend on the length of items which indicates that the words were not processed in a serial way, i.e. letter to letter.

Yet the study of Seymour & Elder poses problems, among them the one of the strictly visual nature of logographic processing. Particularly, one can note that these authors classified as visual errors confusions between items that have also phonological relations, for example, substitutions between letters that differ only in voicing (/p/ versus /b/). Likewise, re-examining individual results, one could see that most of the errors stated as non-visual (150/204) came from a little group of subjects (8 out of 24). It would have been interesting to go into detail with this subgroup, to see what characterized them and to examine if they used phonological cues.

Results obtained by Seymour (Seymour, Bunce & Evans 1992) from a longitudinal study bearing on a population similar to the preceding one have lead this author to re-examine the place of phonological processing in the acquisition of reading. In this study, unlike the preceding one, children learnt not only to recognize words on the whole but also to work on relations between letters and sounds. Results showed that subjects were reading, using logographic strategies and phonological mediation procedure at the same time and not successively. Thus, when they had to read words and non-words, they produced overt sounding while there was no trace of oralization to read their peers name. Likewise, analysis of errors and time to answer showed differences in the processing of these three types of items. These results led Seymour (Seymour, Bunce & Evans 1992, see also Seymour 1994) to propose a double foundation model -- logographic and alphabetic -- for the first stages in reading acquisition. This new model of Seymour is thus contradictory with the hypothesis of strict successivity between logographic and alphabetic processing as formulated in the work of Frith (1985, 1986) and Morton (1989).

Alternatively, the role of phonological mediation in the prereading stage is central in the works of Stuart & Coltheart (1988) and of Ehri & Wilce (1985, 1987). The study of Stuart & Coltheart involved 36 monoglot children. Subjects were seen once before entering school. They were aged between 4:5 and 4:9. Last examinations took place during their fourth year of school. They got through test evaluating their reading skills, their metaphonological skills and their word and letter-sound knowledge. Errors produced by children have been classified into two large categories, on the one hand, the use of non-pertinent information and graphic cues disseminated anywhere in the test word ('milk' read as 'like'); on the other hand, the use of initial and final letters of these items. Results showed that first category errors lessened through sessions while second category errors increased. Moreover, second category error production depended on the subject's metaphonological skill and letter knowledge. According to the authors, these results indicate that prereaders having good metaphonological skills and knowing letter / sound relations could start to read using

initial and final letters of word as phonological cues (see also Stuart 1990). Therefore, the logographic stage -- strictly visual -- might be by-passed in reading development.

Results obtained by Ehri & Wilce (1985, 1987) showed equally the importance of phonological cues in the first stages of reading. Thus, in the 1985 study, these authors proposed a word-learning test based on phonological or visual cues. In the first case, for instance, the word 'giraffe' was written 'JRF' and in the second one 'WBc'. This test was administrated to three groups of kindergarteners, different according to their reading level: prereaders, novices and veterans. According to the results, novices, like veterans, had better performance for words shown with phonic cues. It was not the case for prereaders, who differed from novices in the fact they did not know alphabetic letters.

All the above studies involve the English language. But it might be found that with language having a more regular written system than English, as early as at first stages of reading, there is a greater use of phonological cues and thus a lesser use of logographic strategies as they are traditionally described in developmental models for reading. This is what was found with the German language (Wimmer & Hummer 1990; Wimmer, Landerl, Linortner & Hummer 1991; Wimmer & Goswami 1994; see also Wimmer 1994), which is more regular than English as to the grapheme-phoneme correspondence. Two longitudinal studies by Wimmer (Wimmer & Hummer 1990; Wimmer et al. 1991) involved primary school first graders. These studies thus involved subjects older than those in the preceding studies. Yet, as noted by the authors, in Austria there is no formal reading learning before primary school, while learning starts before 6 in a U.S.A. kindergarten and between 4:5 and 5 in British nursery school. Consequently, children examined in these studies did not have any more learning -- at the beginning of the study -- than those examined in the Anglo-Saxon studies cited above.

The first longitudinal study of Wimmer & Hummer (1990) involved two groups of primary school first graders, and according to their teacher, different in reading skill: average and late readers/writers. 56 subjects aged from 6:10 to 8:1 (mean 7:5) were tested on reading familiar words and pseudowords more or less visually similar to the former. Visually similar pseudowords were made by replacing one letter of familiar words by another visually similar. This modification was never an initial letter and did not modify the shape of the initial word. Dissimilar pseudowords were made from similar pseudowords with another change of one letter. For example, 'Auto' was a familiar word, 'Aufo' and 'Eufo' were respectively similar and dissimilar pseudowords. These items were presented either in a very short time, about a second, or with no time-limit.

Results of this study showed that German children mainly used phonological mediation, and not logographic strategies, to read. Indeed, most children were able to read pseudowords, the reading of these items being correlated to the reading of words. Moreover, the whole performance could be predicted by the level of grapheme-phoneme correspondence knowledge. Finally, performance for words and pseudowords improved with time of presentation; errors were mostly production of a pseudoword having the same initial syllable as the test-item. The same results were found in the two groups of subjects, but with lower performance for late readers (see also Wimmer et al. 1991; Wimmer & Goswami 1994).

Likewise, Rieben's (1993) study, involving French speaking kindergarteners (aged 5:5 on average at the beginning of the year), who did not have any formal learning of reading, showed that at the end of the year 72% of these subjects did not have dominant strategies corresponding to a logographic stage.

All the examined studies, as to the place and nature of logographic strategies, do not always prodice results compatible with descriptions and predictions of developmental models. To sum up, some studies reveal that children, at this stage, read the non-linguistic environment more than linguistic data (see Masonheimer, Drum & Ehri 1984; Gough & Juel 1991), while other studies indicate that if children are not able to process non-lexical units (Byrne 1991), they can globally 'read' words they know (Byrne 1991; Seymour & Elder 1986). Moreover, this non-sequential processing, i.e. ignoring linearity of writing, would be specially visual (Seymour & Elder 1986). The first major problem with regard to developmental models comes from studies showing that some non-lexical processing is not only possible very early but above all that phonological cues play a part at that level (Seymour & Evans 1992; Stuart & Coltheart 1988; Ehri & Wilce 1985, 1987). Consequently, the logographic stage, as described in developmental models, might not be a central stage in reading development (Stuart & Coltheart 1988; Ehri & Wilce 1985, 1987), particularly for languages with more regular orthography than English (Wimmer & Hummer 1990, Wimmer et al. 1991; Rieben 1993). Another contradictory point is the opposition between Frith and Morton on the one hand, and Seymour on the other. Seymour's (Seymour & Evans 1992; Seymour, Bunce & Evans 1992) data indicated that logographic processing might be used at the same time as alphabetic processing, at least by prereaders being taught according to letter-sound correspondence.

The aim of our set of studies was to examine if there is, in French, a logographic stage, before or just at the beginning of formal reading learning. Observations presented in the following studies bear on children who were followed from kindergarten to the end of the first grade of primary school. These children were all non-readers in pre-school. They were presented with a task of matching word to picture. The aim of the observations was to evaluate the role, in this reading task, of the extralinguistic context (studies 1, 2 & 3), of item length (studies 1 & 2), and of the presence of salient graphic cues (studies 2 & 3). Questions dealing with the visual nature of these cues (study 3) and with the sequentiality of processing (study 2) were also examined. Lastly, in the fourth study, relations between metaphonological abilities, letter knowledge and prereading strategies were evaluated.

Given that French is a more regular written system than English as to the phoneme-grapheme correspondence (Gak 1976; Catach 1980), our results are likely to be more similar to those obtained with German children than with English children. Above all, we should be able to possibly observe logographic strategies at pre-school, while children cannot read and have not started formal learning of reading, but not at first grade of primary school.

GENERAL PRESENTATION FOR STUDIES 1, 2 & 3: METHODOLOGY

Material and experimental procedure

The task was a 'reading' test of words in a picture context. A card is presented with a drawing under which is written a word. The task is to tell if the word under the drawing is the 'right' one. When the response is correct, justification is asked for. Three picture-word series were constructed to evaluate hypotheses about the nature of reading logographic strategies.

The aim of the first series (study 1) was to enable evaluation of the taking into account of the length criterion. This series was made of longer and less frequent synonyms than the word normally used by children to describe what was in the picture, e.g. 'bicyclette' for 'vélo' (five synonym foils, see appendix).

The purpose of variables used to elaborate the other two series was to examine two other characteristics of logographic strategies, namely sequentiality of processing and the visual nature of cues processed.

The second series (study 2) was made up of 1/3 of words of the same length as the word drawn in the picture (length foils, 'boîte' under the picture of a rabbit, 'lapin' in French). For the last two thirds, half of the words have the same initial syllable, and the other half, the same final syllable as the word that can be anticipated with the picture (initial syllable foils, 'poules' under the picture of a doll, 'poupée' in French; final syllable foils, 'marche' under the picture of a mouth, 'bouche' in French). There were five items for each foil type, matched for the length (see appendix).

In the third study, pseudowords were used, modifying the initial letter of the name of the drawn object. There were three types of modification, control foils, where there was no proximity, either visual or phonological between substitutes ('t' for 'm' in 'taison' for 'maison'); phonological foils ('f' for 'v' as in 'falise' for 'valise'); visual foils ('p' for 'q' as in 'puatre' for 'quatre'). There were four items for each type of foil matched for length (see appendix).

Selected items were from at least one of the three following frequency tables, the 'Français fondamental' (Gougenheim, Michéa, Rivenc & Sauvageot 1964), the 'Listes orthographiques de base' (Catach 1984) which are the combined versions of several frequency tables (Juilland, Brodin & Davidovitch 1970; Gougenheim et al. 1964; Trésor de la Langue Française 1971) and the Dubois-Buyse scale (Ters, Mayer & Reichenbach 1977). A pre-experiment was conducted to verify first, that the children in last year of pre-school knew the selected words, and second, that the pictures produced the expected word without ambiguity. Items were presented on 5.5x7 cm cards. The drawing was in the upper part of the card, the word being in the lower part. Words were inserted in a 1x7 cm frame and written in bold face, lower case characters of 0.3 to 0.5 cm in height.

This set of studies being conducted with non-reading pre-school children, the three series of items were presented in a single session. The children saw at the same time all 32 pairs of the experimental items. In order to balance positive and negative responses, items with words corresponding to the picture were added to the experimental lists. But, insofar as the pre-experiment showed that prereading children tend to prefer positive responses, whatever the item characteristics, there were only eight filling items and correct responses could be only a third of the positive responses.

The presentation order of the cards was semi-randomized. The session (individual) lasted ten minutes. Cards were shown, one by one, the child being left to work at his/her own rhythm, without help. The child was told to look at picture and word, silently, and then, say from his/her own viewpoint, if the word written under the picture was the 'right' one. If the response was correct, a justification was systematically asked for.

Results analysis involved correct responses and accompanying justifications. A response was correct if the child either read the written word or detected the error, e.g. 'it is not the right word because there is a doll ('poupée') in the picture and it is written '/pul/' (study 2), or else 'it is not right, in banana ('banane') there is no /d/ at the beginning'. The justifications had been divided into five types:

- correct justification;
- letter justification: this involves vague responses bearing on letters; for instance a child shows the end of the word 'poules' below the picture of a doll (poupée) and says 'there are letters that don't work' (study 2);
- semantic justification, dealing with the picture; e.g. 'bicyclette' is accepted with the response: ''vélo' is written (study 1), or else 'it is not right, it is not written 'poupée' (doll)'' (study 2);

- length justification: the child may justify his/her response with the length of the word written being too short or too long;
- no justification: the child refuses to justify his/her response.

This word-picture reading test was conducted twice during pre-school (December and June) and twice during the first grade of primary school (January and June). Letter knowledge and phonological awareness were evaluated at the beginning of the study (December in pre-school, see study 4).

Population

The subjects were thirty-seven children in their last year of pre-school, 65 months old on average (s.d.=2.9). All were native French speakers, in the appropriate grade for their age, average in cognitive development (over the 50th percentile on Raven's Progressive Matrices) and non-readers in this last year of pre-school. They had been followed from the beginning of their last year of pre-school until the end of the first grade of primary school. The reading level in pre-school was evaluated using a standardized test which allowed for a metric approach (BAT-ELEM, Savigny, 1974). All children who could read more than six letters or non-meaning syllables were eliminated. At that time they were enrolled in 16 different classes in 8 schools. During pre-school, there was neither reading instruction, nor sound-letter correspondence learning. In first grade, the methods of reading instruction were different. Most of them were mixed methods with variations as regards when grapheme-phoneme correspondence rules were explicitly taught. Schools were located in different areas of the Paris suburbs, pooling different populations of different socio-economical levels, thus being representative of the French variety.

STUDY 1

In this study we examined results for word/picture pairs in which the written word is a synonym longer than the word usually used by children to name what is in the picture, for instance, 'bicyclette' under the drawing of a bike (in French 'vélo', synonym foils).

If kindergarteners used logographic strategies one is likely to observe a contextual anticipation effect, through the drawing, and the use of the length criterion. This kind of strategies should produce a great number of errors (written word rejected) because the synonym foils are longer than the words normally used by children to name what is drawn. On the contrary, there should be few semantic justifications since it is difficult to confound for example 'bicyclette' with 'vélo'.

Results involved correct responses and corresponding justifications. The effective number of correct responses and the number of correct responses above the chance level were computed. ANOVA was conducted on the two types of data. These two analyses yielded similar results. In the following, only the above chance level scores analysis will be reported. Descriptive analysis was conducted on justifications matching all correct responses. In addition, correspondence analysis was used to sum up the results. As for the exploratory data analysis and the interpretation of the multidimensional analysis the EyeLID program was used (Bernard, Leroux, Rouanet & Schiltz 1989).

Results

Correct responses

Table 1 (effective number of correct responses) and Figure 1 (number of correct responses above the chance level) showed similar trends. The number of correct responses changes in a non-linear way throughout the four sessions. There is a

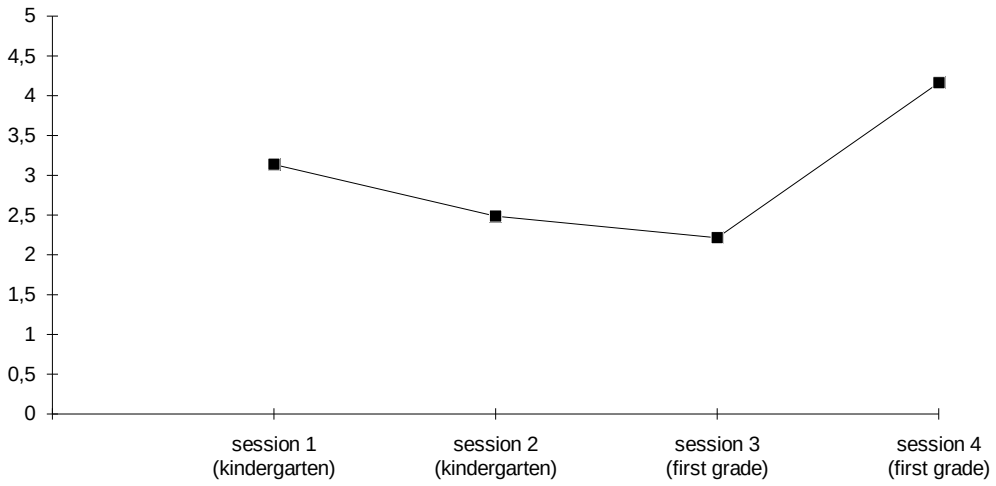
decrease in correct responses from the first to the third session followed by an increase. The session main effect is significant [$F(3,108)=7.49$, $p<0.01$]. This effect is mainly due to the difference between sessions three and four [$F(1,36)=31.16$, $p<0.01$] since there is no significant effect either between sessions one and two [$F(1,36)=1.73$, $p>0.10$] or between sessions two and three [$F(1,36)=0.26$, $p>0.10$].

Table 1: Correct responses for synonym foils ('automobile' for voiture): mean (maximum=5)

session 1 (kindergarten)	3.51 (1.39)
session 2 (Kindergarten)	2.97 (1.57)
session 3 (First grade)	2.76 (1.67)
session 4 (First grade)	4.32 (0.88)

Standard-deviations are in parentheses

Figure 1: Mean number for correct responses (above the chance level): synonym foils ("automobile" for voiture)



Correct response justifications

The results can be summed up in two ways. Firstly, the number of correct justifications increases along sessions (11% for the first two sessions versus 76% and 91% respectively for the last two sessions). Secondly, children gave many semantic justifications as kindergarteners but almost none during the first grade of primary school (for example they accept 'bicyclette' with justification 'it is written vélo' in 78% and 58% of the cases for sessions 1 and 2). These two kinds of justification are nearly 85% of all justifications for all sessions (49,6% for correct justifications and 35,1% for semantic justifications). Consequently, there were few other justifications (4,8% letter justifications, 2,8% length justifications and 7,8% no justification).

Table 2: Number of correct responses justifications for synonym foils

synonym foils	Correct	Letter	Semantic	Length	No justific.	Total
S1 (kindergarten)	14	1	101	6	8	130
S2 (kindergarten)	12	9	64	8	17	110
S3 (first grade)	78	14	5	0	5	102
S4 (first grade)	145	0	6	0	9	160
total	249	24	176	14	39	502

From the correspondence analysis of Table 2 the first two axes were kept, their contribution being 97,4% of the total variance (87,1% for the first axis, 10,3% for the second one). The first axis (see Figure 2) contrasts the kindergarten to the primary school sessions. The former may be characterized by semantic and length justifications, while the latter are characterized by correct justifications. The second axis contrasts sessions 1 (semantic justifications) and 4 (correct justifications) to sessions 2 and 3, where there are still length justifications.
Insert about here Figure 2

Discussion

There is an increase of correct responses only between sessions 3 and 4. The lack of improvement between sessions 2 and 3 can be explained by the fact that, in the last year of kindergarten, children tend to prefer positive responses whatever the items characteristics and without correctly justifying these responses. But, as soon as they are in primary school, when starting to learn to read, there is a change in their strategy, which can be noted by the fact that children are able to justify most of their correct responses. One can think, therefore, that correct responses status, that is 'yes' responses, is not the same in kindergarten and in primary school.

The kindergarten results do not confirm our hypotheses since children do not seem, when prereaders, able to use length cues to give their responses. They consider the written word as the 'right word', even if they anticipate with the picture a shorter synonym than the word which is written under the drawing. This is why there are so many semantic justifications.

STUDY 2

This study deals with word/picture pairs for which the word that can be anticipated from the picture has the same length (length foils) and can also have either the same initial syllable (initial syllable foils) or the same final syllable (final syllable foils).

Logographic processing is normally non-sequential. Therefore, there should be no difference in the processing of initial and final syllable foils. Yet, if children at the logographic stage are using graphic cues besides the length criterion to 'read' words, scores for the initial and final syllable foils should be worse (more false acceptation of the written word) than those expected for length foils which have only the same length as the word that can be anticipated from the drawing.

In this study, the correct responses were rejection of the written word. As for the first study, two analyses were conducted for correct responses. The first one took into account the effective number of correct responses and the other the scores above the chance level. ANOVA were conducted on these two types of data and gave similar results. Only the second one is reported here. This analysis bears on the factor Session (4 Sessions) and on the factor Type of foil (length foils, syllable initial foils et syllable final foils). When there was a main effect for type of foil, two contrasts were made, effect of the place of the common syllable (initial vs. final syllable foils), effect of the presence of a common syllable (initial and final syllable foils versus length foils). Descriptive analyses using correspondence analysis were conducted for justifications matching all correct responses.

Results

Correct responses

Results are shown in Table 3 (all correct responses) and Figure 3 (correct responses above the chance level). We observed a main effect for sessions [$F(3,108)=109.85$, $p<0.01$]. Nevertheless, performance improved only between the

last session of the kindergarten and the first session of the first grade [F(3,36)=87.90, p<0.01] and between the two sessions of the first grade [F(3,36)=12.86, p<0.01]. There was no significant difference between sessions one and two [F(3,36)=.87, p>0.10].

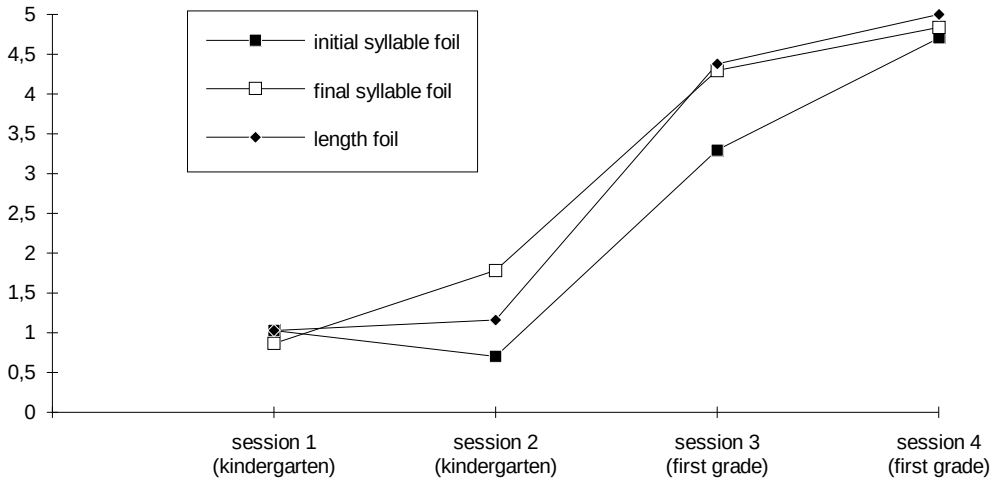
There was a type of foil main effect [F(2,72)=10.15, p<0.01], and Session x Type interaction was significant [F(6,216)=3.84, p<0.01]. This interaction was due to a greater difference between the three types of foils for the second and the third session as compared to the first session. The type of foil main effect was mainly due to a difference between initial and final syllable foils. Contrary to the hypotheses, the place of the common syllable had an impact on performance [F(1,36)=18.74, p<0.01] since the presence of a common syllable had no effect [F(1,36)=3.16, p>0.10]. When the common syllable was at the beginning of the word, there were less correct responses than when the common syllable was at the end of the word. This effect was only significant for sessions 2 and 3 [F(1,36)=13.33, p<0.01 and F(1,36)=14.17, p<0.01, respectively]. The lack of significant effect between initial and final syllable foils for the fourth session [F(1,36)=1.49, p>.10] may be due to ceiling effects (between 95 and 97% of correct responses).

Table 3: Mean number of correct responses for initial syllable foils, final syllable foils and length foil

	Initial syllable foils	Final syllable foils	Length foils
Session 1 (kindergarten)	1.60	1.65	1.38
	(1.48)	(1.36)	(1.66)
Session 2 (kindergarten)	1.46	2.27	1.92
	(1.22)	(1.73)	(1.55)
Session 3 (first grade)	3.54	4.32	4.43
	(1.79)	(1.31)	(1.26)
Session 4 (first grade)	4.73	4.84	5.00
	(0.80)	(0.50)	(0.00)

standard-deviations are in parentheses

Figure 3: Mean number for correct responses (above the chance level): initial and final syllables foils and length foils



Correct response justifications

Analysis of the frequencies for correct response justifications, with the three types of foils (initial syllable, final syllable and length foils) showed no difference in the profiles of types of foils along sessions. Therefore, in the results reported thereafter, types of foils are pooled.

Results are shown in Table 4. The greatest changes can be observed between kindergarten and the last primary school session. The most notable difference between these sessions is that kindergarteners gave no correct justification at all while correct justifications are 94,1% of all justifications at the end of the first year of primary school. Secondly, children gave many semantic justifications as kindergarteners (40,9% for the first session and 20,1% for the second one) but almost none during the first grade of primary school. These two kinds of justification are make up nearly 60% of all justifications for all sessions (51% for correct justifications and 8,9% for semantic justifications). Unlike the preceding study, two other kinds of justification are also frequently used by children, letter justifications and, to a lesser extent, no justification (25,8% for letter justifications and 12,7% for no justification for all sessions). There are very few length justifications (1,6% of all justifications).

Table 4: Number of correct responses justifications for length and syllable foils

syllable & length foils	Correct	Letter	Semantic	Length	No justific.	total
S1 (kindergarten)	0	32	70	9	60	171
S2 (kindergarten)	0	90	42	12	65	209
S3 (first grade)	194	210	5	1	45	455
S4 (first grade)	507	23	5	0	4	539
total	701	355	122	22	174	1374

With correspondence analysis two axes were kept, that is 99,3% of total variance (78,8% for the fist axis, 20,5% for the second one, see Figure 4). The first axis contrasts the kindergarten sessions where there are semantic and length justifications or no justification, from the last session of primary school with a great amount of correct justifications. As in the preceding study, the second axis contrasts sessions 1 and 4 to sessions 2 and 3. The latter are characterised by letter justifications (respectively 43,1% and 46,1% of all justifications in sessions 2 and 3). Yet, letter justifications are already frequent in session 1 (18,7% of all justifications).

When analysing the individual clouds, one can see very different profiles thus indicating different evolution from one child to another.

Insert about here Figure 4

Discussion

Results showed a significant improvement only between sessions 2 and 3, and between sessions 3 and 4. Moreover, as in the preceding study, there is no improvement between sessions 1 and 2. All the more, scores for this study were mainly explained by the place of the common syllable, rather than its presence. Children gave less correct responses for initial syllable foils. Yet this effect is not the same throughout the four sessions. Initial syllable foils produce more errors than final syllable foils only at the end of last year of kindergarten and at the beginning of primary school. These results denote that children, as early as the end of kindergarten, are using sequential processing, from left to right, which is contradictory with the hypothesis of prereaders using only logographic strategies, since these strategies are usually non-sequential. Due to a ceiling effect in the last session, it is impossible to draw conclusions for children at the end of primary school first grade.

As for justifications, as in the preceding study, greater changes between kindergarten and primary school sessions involve an increase of correct justifications, a decrease of semantic justifications and of no justifications. There is also, as in the first study, a weak use of the length criterion, the only difference from study 1 being that there is an increase in letter justifications from the first to the third session.

STUDY 3

In this study items used corresponded to the name of what was drawn in the picture, except for the initial letter. This initial letter was replaced by a letter having either a visual proximity with the target-letter (e.g. 'danane' for 'banane', visual foils), or a phonological proximity (e.g. 'falise' for 'valise', phonological foils), or else no proximity at all (e.g. 'taison' for 'maison', control foils).

If, at the logographic stage, children are using salient graphic cues, and if these cues are mostly of a visual type, one should observe a difference between phonological and control foils on the one hand, and visual foils on the other; the latter, having a visual proximity with the expected word, should produce more errors than the other kinds of items. On the contrary, there should be no difference between phonological and control foils, phonological proximity between two different letters, from a visual viewpoint, should not modify performance at the logographic stage.

Results for the primary school first grade children, having started learning to read, should be different; phonological proximity might particularly modify performance in a negative way. Thus, one can expect a difference between phonological and control foils for these children.

ANOVA was conducted with a 4 Sessions by 3 Types of foil design, on the two types of data, the effective number of correct responses and the same above the chance level. Reported results involve the above chance scores. When there is a type of foil main effect, then two contrasts were computed, visual versus phonological and control foils, and phonological versus control foils.

Results

Correct responses

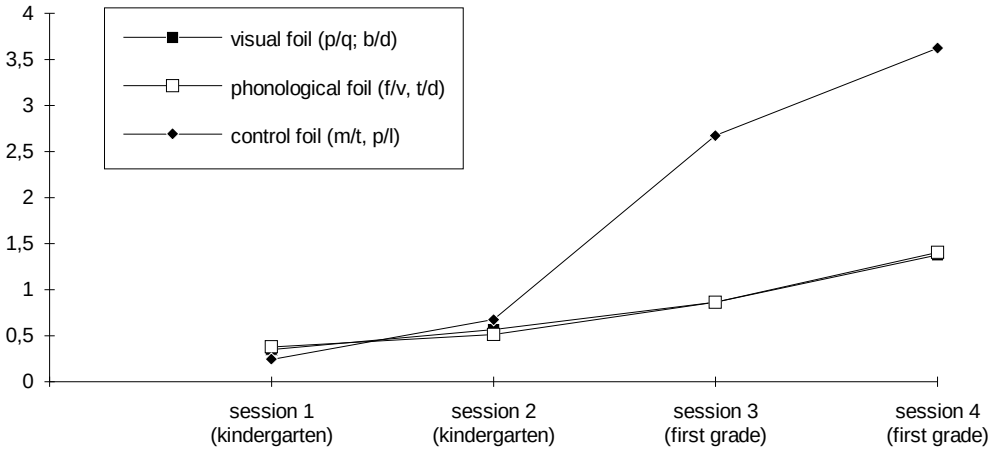
There is an increase in correct responses between sessions (see Table 5 and Figure 5) with a significant effect [$F(3,108)=24.92$, $p<0.01$]. Yet performance improves only between kindergarten and the middle of first grade [sessions two and three, $F(1,36)=9.75$, $p<0.01$], and between the latter and the end of the first grade [sessions three and four, $F(1,36)=7.26$, $p<0.05$]. There is also a Type of foil effect [$F(2,72)=34.75$, $p<0.01$] and a Session x Type of foil interaction effect [$F(6,216)=14.49$, $p<0.01$]. Last, there is a significant effect for the two contrasts [visual vs. phonological & control foils, $F(1,36)=79.35$, $p<0.01$, and phonological vs. control foils, $F(1,36)=66.36$, $p<0.01$]. Additional comparisons lead to observing no difference between the kindergarten sessions as to the contrasts already cited. Alternatively, these differences are significant for each of the first grade sessions [$F(1,36)=39.64$, $p<0.01$ and $F(1,36)=35.32$, $p<0.01$ for the session 3 and $F(1,36)=94.88$, $p<0.01$; $F(1,36)=62.74$, $p<0.01$ for the session 4]. In these two sessions, the lesser scores were on phonological foils and control foils as compared to visual foils and particularly on phonological as compared to control foils.

Table 5: Correct responses for visual, phonological and control foils: mean (maximum=5)

	Visual foils	Phonological foils	Control foils
Session 1 (kindergarten)	1.05	1.00	1.03
	(1.15)	(1.13)	(1.04)
Session 2 (kindergarten)	1.24	1.14	1.51
	(1.12)	(1.08)	(1.28)
Session 3 (first grade)	1.68	1.46	3.08
	(1.33)	(1.43)	(1.12)
Session 4 (first grade)	2.30	2.00	3.70
	(1.10)	(1.37)	(0.66)

standard-deviations are in parentheses

Figure 5: Mean number for correct responses (above the chance level): visual, phonological and control foils ("puatre" for quatre; "falise" for valise, "taison" for maison)



Correct response justifications

As in the second study, there was no difference in the profiles of the three types of foil (visual, phonological and control foils). Data were pooled over the types of foil.

The main differences were between kindergarten and primary school sessions (see Table 6). There were almost no correct justifications in kindergarten sessions, while this kind of justification represented 67,8% and 91,5% of the justifications for the sessions 3 and 4 respectively. At the same time, the absence of justification is quite high in the first two sessions (57% and 36%, respectively). There is also a great amount of letter justification in session 2 (38%) but also in session 3 (20,9%) and to a lesser extent in session 1 (17,5%). For all the sessions, the most numerous justifications are the correct ones, then the absence of justification and lastly the letter justifications (55,7%, 18,1% and 17,4% respectively). There are very few length justifications (2,3%) and semantic justifications (6,4%).

Table 6: Number of correct responses justifications for initial letter foils

Initial letter foils	Correct	Letter	Semantic	Length	No justific.	total
S1 (kindergarten)	3	20	23	3	65	114
S2 (kindergarten)	7	54	18	13	52	144
S3 (first grade)	156	48	7	2	17	230
S4 (first grade)	271	15	2	0	8	296
total	437	137	50	18	142	784

Factorial analysis confirms these profiles. The greatest difference is between the kindergarten and primary school sessions (see Figure 6). The first axis (89,2% of total variance) contrast the first two sessions to the last ones, which are characterized by correct justifications. The second axis (9,8% of total variance) opposes sessions 1 and 4 to sessions 2 and 3 which are characterized by letter justifications.

As in the preceding study, examination of individual profiles shows differences from one child to another. For instance, in the second session, of 37 children, 6 gave all the length justifications and 15 gave all the letter justifications.

Insert about here Figure 6

Discussion

According to the literature, logographic strategies are characterized by the use of visual cues instead of phonic cues. One should have observed in prereaders -- assumed to be logographic readers -- a difference only between visual foils versus phonological and control foils. The former should have produced more incorrect responses than the latter. On the contrary, there should not have been any difference between phonological and control foils since phonological proximity should not influence logographic performance.

This is not exactly what was observed for kindergarteners. Results show no difference either between visual versus phonological and control foils or between phonological versus control foils. On the other hand for first graders, phonological versus control foil difference is significant, the worst scores being for the phonological foils. These results indicate that children are then troubled by phonological proximity.

Moreover there is no performance improvement between the two kindergarten sessions as in studies 1 and 2; improvement can be observed only between kindergarten and the primary school first session, and between the two primary school sessions, as in the preceding study.

For justifications, there were a lot of correct justifications in first grade and almost none in kindergarten. There was also a great amount of no justification in kindergarten. Alternatively, there were few length and semantic justifications, whatever the sessions. We also observed similarities between sessions 2 and 3 which were characterized by a great number of letter justifications. Nevertheless, this kind of justification was already non-negligible in the first session. Yet analysis of individual profiles showed that this kind of justification was only made by certain children (15 out of 37 for session 2).

STUDY 4

All observed children were non-readers during the first two sessions. Thus, the results for these sessions cannot be explained by differences on those grounds. But, these results can be explained when considering metaphonological abilities of these children, or their letter knowledge; these two variables seem to have an influence on prereading strategies (see Stuart & Coltheart 1988; Ehri & Wilce 1985, 1987; Wimmer & Hummer 1990, Wimmer et al. 1991). So, at the start of the study (in December for kindergarten), these abilities were evaluated by two tests, one of phonological awareness and one of letter knowledge.

Phonological awareness was tested by a same/different rhyme and alliteration task for monosyllabic items. There were four subtests of ten items each; the first was a rhyme test for C/VC items. The second and the third were an alliteration test for C/VC or CC/V items. The fourth concerned the first consonant and the first vowel of CV/C items. For each category, one half of the items shared the same rhyme or the same alliteration. All the test items were pseudowords, which were used to prevent biases as a result of the level of vocabulary of the children. The children were asked if 'they heard the same thing at the end' (rhyme task) or 'at the beginning' (alliteration task) of an 'invented word'. Before the presentation of test items children were given practice items. All tasks were presented with a tape recorder. For the rhyme/alliteration tasks, the four subtests were given successively (C/CV, C/CV, CC/V, CV/C). The children were tested individually. During the test session, no feedback was provided. These tasks were given at the same time as the word reading test in the first session of kindergarten.

The other test bore on the sound and name of letters. Ten frequent consonants and five vowels were tested. The consonants were four stops (b, d, p, t), two nasals (m, n), three fricatives (f, v, s) and one liquid (r). The vowels were those that can be

presented with a simple letter, without diacritical cues, a, o, i, u and e. Inasmuch as name and sound are the same for vowels, children were only asked to give the name of the vowel. The maximum number of correct responses was therefore 15 for name of letters, 10 for sound, that is, a total of 25. Letters were shown in lower case characters of 5 to 8 mm height. As in the preceding tests, the task was individual. These tasks were given at the same time as the word reading test in kindergarten.

Correlations between the effective number of correct responses for the three word/picture reading tasks and these two tests were computed. In the same way, correlations between rhyme and letter knowledge tests were computed in order to see if these two tests refer to a common type of knowledge and ability.

Results

Correlations between rhyme test and letter knowledge test are significant (.48). As for the correlations between these two tests and the word/picture reading task, in kindergarten (see Table 7), they are negative with the synonym foil task. But for the same sessions, correlations between rhyme, letter knowledge tests and the two other word/picture reading tasks, are all positive.

Moreover, correlations between letter knowledge and syllable and length foils task were all significant. The same trend was obtained for the rhyme task. On the other hand, for the initial letter foil task, the correlations were all significant except for the rhyme task in the second session.

Table 7: Correlations between correct responses between the three word/picture reading task (for the 2 kindergarten sessions) and letter knowledge, rhyme & alliteration awareness scores (kindergarten, session 1)

SYNONYM FOILS	session 1	session 2
letter knowledge (session 1)	-.27	-.41*
rhyme awareness (session 1)	-.33*	-.11
SYLLABLE & LENGTH FOILS		
letter knowledge (session 1)	+.45**	+.49**
rhyme awareness (session 1)	+.43**	+.34*
INITIAL LETTER FOILS		
letter knowledge (session 1)	+.45**	+.43**
rhyme awareness (session 1)	+.43**	+.19

**=<p.01; *=<.05

Discussion

Correlations between metaphonological, letter knowledge tests and word/picture reading tasks revealed a contrast between the synonym foil task (study 1) and the two other tasks (studies 2 and 3). These results can be added to those obtained from the analysis of positive responses in the first study. The latter showed that kindergarteners tended to prefer systematically positive responses, whatever the item characteristics. By the way, the 'yes' response is the correct response in this first task, but not in the two others.

The positive and significant correlations observed for the two other word/picture reading tasks (except one but see below) might show that some children, being sensitive to the sound aspects of language (see the rhyme test) and knowing alphabetical letters, can use such knowledge to give correct responses, thus being able to put forth reading strategies bearing on alphabetic cues, without actually being able to read.

The lack of significant correlation between the phonological awareness task and initial letter foil task for the second session may be explained by two trends. First of all, in this task we used phonological foils. This kind of foil can disturb children who rely more on the phonological process. Therefore, those children can be those who obtained both the better scores in the phonological awareness task and the lesser scores on the phonological foils in the reading task. On the other hand, we observed a change between session 1 and session 2 for justification in the initial letter foil reading task. For the second session, there were a lot of letter justifications in this task (38%) all produced by 15 of the 37 children. These children could be those who rely more on the phonological process.

STUDY 5

The last hypothesis was tested by a comparison of the results obtained on the rhyme, letter knowledge and initial letter foils (phonological foils as compared to control foils) by the 15 children giving all the letter justifications on the one hand and by all the other children of the sample (N=22) on the other hand.

Results

Table 8 contains the scores of these two groups of subjects in the different tasks. Children relying on letters to justify their responses have systematically better results than those of the other group. This superiority is significant for rhyme and letter knowledge tasks [respectively $t(35)=3.73$, $p<0.01$; $t(35)=2.21$, $p<0.05$]. It is also significant for control foils and against the hypothesis for phonological foils [$t(35)=2.30$, $p<0.05$; $t(35)=4.63$, $p<0.01$, respectively].

Yet it has to be added that, for phonological foils, among the 29 correct responses given by the children using letter justification, 20 were letter justified and 2 correctly justified. On the whole these children gave 76% of their justifications appertaining to the use of alphabetic processing.

Table 8: Mean scores for the children with letter justification and the group without letter justification

	Rhyme task Session 1	Letter knowledge Session 1	Initial letter foils task session 2	
			Phonological foils	Control foils
children with letter justification	30.3 (2.69)	5.73 (4.89)	1.93 (0.96)	2.07 (1.22)
children without letter justification	25.4 (4.59)	3.0 (2.6)	0.59 (0.8)	1.14 (1.21)

standard deviations are in parentheses

On the contrary, the 13 correct responses for phonological foils given by subjects of the other group are never followed by justifications that we called 'alphabetic'. For one half they were semantic and length justifications, for the other half absence of justification. However, results obtained by these children showed a difference between phonological foils and control foils, which indicates that these subjects gave less correct responses for the former than for the latter [$t(21)=2.42$, $p<0.05$]

Discussion

The hypothesis was that the lack of correlation between rhyme and initial letter foil tasks in the second session might be explained by the fact that the children having the highest level in phonological awareness could be disturbed by phonological foils in the initial foils reading task. On the other hand, the children using letter justifications should have the highest scores in phonological awareness. This

hypothesis is not completely confirmed. As a matter of fact, the children using letter justifications have the best scores in phonological awareness. Yet on phonological foils, these children have no worse scores than the other children. But, unlike the other children, they are able to give alphabetic justifications (letter justification and correct justification) for most of their correct responses on phonological foils.

This never happened in children of the other group, who also are at a weaker level in letter initial knowledge and in phonological awareness. But it seems difficult to support the fact that these children use only visual logographic strategies since their scores on phonological foils are worse than those on control foils.

GENERAL DISCUSSION

The aim of this study was to evaluate reading strategies used by French speaking beginning readers (first graders) as compared to prereaders (kindergarteners). Prereaders were non-readers and had never been taught on reading or on letter-sound correspondence.

Our main hypothesis was that prereading children used logographic strategies, which, according to the literature, are characterized on the one hand by the use of the global form of the word (its length), on the other hand by the non-sequentiality of the processing and lastly by the use of salient visual cues. Alternatively, it is predicted that beginning readers use different information processing; specially one should not find among these children traces of logographic strategies. One must specify that, in so far as these children were observed within a longitudinal study, if one observes expected differences between outcomes at two different periods (kindergarten and first grade), they might be attributed to developmental dynamics.

If prereading children used the global form of a word to identify it (more precisely its length), one should have obtained a great amount of wrong negative responses for the first study; this being explained by the fact that the synonym written under picture is longer than the familiar word used to designate what is in the drawing. In fact, for the two kindergarten sessions, there was a great amount of correct responses but with erroneous semantic justifications (for instance, facing the word 'bicyclette', it is right because it is written 'vélo'). These children seem to consider rather systematically that what is written is the 'right word', whatever the length difference between anticipated picture-word and the one actually written. The peculiar status of these positive responses equally comes from the fact that there were negative correlations between these responses and phonological awareness and letter knowledge of children, while positive correlations were systematically observed between these tasks and two other word-picture reading studies (see study 4).

Moreover, logographic processing is characterized by its non-sequentiality. Accordingly, one should not have observed, in the second study, any difference between initial and final syllable foil processing in so far as the place of the common syllable for the target-word and the test-word should have no influence on non-sequential processing. Yet, if children at a logographic stage were using, besides the length criterion, local graphic cues to identify words, initial and final foil scores should have been lower than those expected for length foils, which only share length with the picture-word. In fact, for the first session, we observed that there were no differences between the three types of items. On the other hand, results indicated a type of foil effect for the second session, explained by the place of the common syllable and not by its presence. Test-words having the same initial syllable as the target-word induce a greater number of errors than those having the same final

syllable. This result shows that these children, at the end of kindergarten, are using sequential processing, from left to right. This result, and the one observed for letter justifications, in this study as well as in the following one, are the only ones giving evidence of a change of 'prereading strategies' between the two kindergarten sessions.

Lastly, if these children were using salient graphic cues, and if these cues, at the logographic stage, were essentially visual, one should have observed, in the third study, worse results for visual foils which have an initial letter change visually near the expected letter, and these items should have produced a greater number of errors than those having an initial letter change visually different from the expected letter, whatever the phonic proximity between substitutes (phonological and control foils). As a matter of fact, results showed that children do not produce more errors on visual foils than on the two other types of foils.

Results for correct responses in the three studies showed alike that prereaders did not improve between the two kindergarten sessions; this indicates that the reading strategies they use have no generative power. Moreover, it should be observed that positive responses, which are correct responses in the first study but not in the two others, are dominant in kindergarten. In the first session, there are indeed 70% of 'yes' responses for synonym foils, 69% for syllable and length foils and 74% for initial letter foils. These percentages were respectively 59%, 62% and 68% in the second session. These results showed that children tend to systematically accept as correct what is written. The great amount of semantic justifications for the positive responses of the first study (acceptation of 'automobile' justified by 'voiture') indicate that these children are reading the environment rather than the word itself. This result is consistent with the one reported in Masonheimer, Drum & Ehri (1984) and Gough & Juel (1991). Nevertheless one can wonder if it is actually possible to speak of reading strategies.

There is a change in 'prereading strategies' between the two kindergarten sessions as to the use of letters to justify responses. Factorial analysis showed a second axis gathering sessions 2 and 3 characterized by letter justifications, in the three studies. But one must notice that, on the one hand these justifications are specially present in studies 2 and 3 in which correct responses are negative responses. On the other hand, still in these two studies, they are already prevalent as of the first session. Finally, these letter justifications are only produced by some children (15 out of 37 in study 3). When comparing the results of these children to those of the other children in this population (study 5), one may note that, at the beginning of kindergarten, the former had a better letter knowledge and above all a better phonological awareness than the latter. This result indicates that children having some phonological sensitivity and knowing letters could draw on this knowledge to produce correct responses, before they can read, by prereading strategies that rely on partial alphabetic cues. These results are consistent with those observed by Ehri & Wilce (1985) and by Stuart & Colheart (1988). According to Stuart & Colheart, the way a child approaches reading depends on his/her metaphonological ability; those who have high ability in this field will use it at the beginning, while those not having this ability will approach reading as a visual memory task. There should not be a logographic stage for the former. Yet it seems difficult to assert that children of the other group would only use visual strategies since it was observed, in the initial letter foil task, that they had worse results for phonological foils than for control foils; the phonological similarity between visually different letters changed their performance for the worse, indicating sensitivity to phonology.

Observed trends in beginning readers at first grade were different. As a matter of fact, results of these children were characterized, in the three tasks, firstly by a great amount of correct responses with pertinent justifications. Moreover, first graders did not produce any semantic justification. These results, and particularly the number of correct responses and justifications, can be interpreted as indicating that alphabetic procedure has been used. This procedure is normally characterized by sequentiality and sensitivity to phonic characteristics.

The use of sequential processing is illustrated by the result of the second study. These results did not indicate any trend on the whole for the last first grade session because of ceiling effects. On the other hand, for the first session of first grade, performances were weakened by the presence of an initial common syllable. These results show that these children are using sequential alphabetic processing -- from left to right -- which is not yet well mastered. Sensitivity to phonic characteristics was highlighted by analysis of performances for the third study. A difference between phonological and control foils was observed, phonic proximity between substitutes minimizing performance. So there was no trace of logographic processing among the first grade population. This result is congruent with those of Wimmer & Hummer with German speaking subjects (Wimmer & Hummer 1990, Wimmer et al. 1991; Wimmer & Goswami 1994).

To sum up, our data show that first graders do not use logographic strategies. For kindergarteners, we could not actually observe any trace of logographic strategies as they are described in developmental models, besides the fact that these subjects seem, at this stage of their lexical development, to read rather the environment than the word itself (Frith 1985, 1986; Morton 1989). On the other hand, this type of strategy has been observed, in a similar task, with dyslexic subjects, aged 10 (cf. Sprenger-Charolles 1991). These children perceived global incompatibilities between the written word and the one they anticipated via the picture well enough, but they had selective difficulties detecting local errors. For example, 'byniclette' (pseudo-synonym of 'vélo', bike) was the most refused, not because of the modified letter but because 'it's too long for vélo'. These results indicate that subjects were systematically using global procedures to identify words. One can suppose these strategies were only used to compensate for their inability to correctly identify words (Stanovich 1980).

Results obtained for this study lead to questioning the generality of some aspects of reading developmental models resulting from research bearing on English-speaking subjects. As a matter of fact, the results achieved with French-speaking prereaders and starting readers lead us to question, for the examined population, the very existence of logographic strategies as they are usually described in developmental models. On the other hand, results obtained with dyslexic subjects might suggest that logographic strategies could be compensatory strategies, coming later.

APPENDIX

LIST OF ITEMS USED IN EXPERIMENTS

STUDY 1: SYNONYM FOILS

autobus: bus/car
automobile: voiture
bicyclette: vélo
locomotive: train
militaire: soldat

STUDY 2: SYLLABLE & LENGTH FOILS

(the first word correspond to the drawing and the second one to the written name)

Initial syllable foils	Final syllable foils	Length foils
poules/poupée	banque/masque	camion/fraise
mouche/mouton	titre/montre	boite/lapin
chaton/chapeau	marche/bouche	livre/cloche
cousin/couteau	statue/tortue	serpent/marteau
chemin/cheval	libre/arbre	canard/bateau

STUDY 3: INITIAL LETTER FOILS

Visual foils	Phonological foils	Control foils
bocteur (d/b)	dambour (t/d)	mable (t/m)
danane (b/d)	trapeau (d/t)	taison (m/t)
puatre (q/p)	falise (v/f)	pavabo (l/p)
pueue (q/p)	venêtre (f/v)	loisson (p/l)

OTHER ITEMS (FILLERS)

dragon, écharpe, escargot, étoile, feuille, réveil, robinet, soleil

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